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PLANETARY PHENOMENA FOR JANUARY AND FEBRUARY, 1923

By MALCOLM McNEILL

PHASES OF THE MOON, PACIFIC TIME

Full Moon,	Jan. 2, 6 ^h 33 ^m P.M.	Full Moon,	Feb. 1, 7 ^h 53 ^m A.M.
Last Quarter,	" 9, 4 54 P.M.	Last Quarter,	" 8, 1 16 A.M.
New Moon,	16, 6 41 P.M.	New Moon,	" 15, 11 7 A.M.
First Quarter,	24, 7 59 P.M.	First Quarter,	" 23, 4 6 P.M.

During 1923 there will be four eclipses, two partial eclipses of the Moon, on March 2 and August 25-26, respectively, both visible in the United States, an annular eclipse of the Sun on March 16-17, not visible in this country, and a total eclipse of the Sun on Sept. 10, the lines of totality just touching the extreme southwest part of the United States; this may be seen as partial throughout the country.

Saturn, *Venus*, and *Mars*, also the first magnitude star *Aldebaran*, a *Tauri*, will all be occulted by the Moon during January; the occultation of *Venus* on the early morning of Jan. 13, and that of *Aldebaran* on the early evening of Jan. 27 will be visible in this country.

The Earth is in perihelion on Jan. 2.

Mercury is an evening star at the beginning of January, setting rather too soon after sunset for easy naked eye visibility, but its apparent distance from the Sun is increasing and in a few days it is an easy object in the evening twilight. Greatest east elongation is reached on Jan. 13 when the planet remains above the horizon, about an hour and one-half. This greatest elongation, 18°56', is rather a small one as the planet reaches perihelion about a week later. This also works to make the interval between greatest elongation and inferior conjunction unusually brief as the planet's actual motion in space is now most rapid. The result is that the duration of visibility is much below the average, so that soon after the middle of the month the planet has come too close to the Sun for evening observation. Inferior conjunction is reached on the evening of Jan. 28, the planet becoming a morning star. The planet's distance from the Sun now increases rapidly, and greatest west elongation is

reached on the evening of Feb. 22. During the latter half of February it will rise an hour and a quarter or more before sunrise, and the conditions for visibility in the morning twilight are fair. The planet is considerably south of the Sun, which shortens the interval between the risings of the two bodies, but this is to a great extent compensated for by the unusual size of the greatest elongation, $26^{\circ}42'$. This occurs when the planet is within two weeks of aphelion. Conditions for easy visibility as a morning star during the early months of the year are seldom as good.

Venus is a morning star throughout the two months, rising a little more than three hours before sunrise, on Jan. 1, the period shortening to less than two and one-half hours by the end of February. During January the apparent distance between Sun and planet increases slightly and greatest west elongation is reached on Feb. 3. For the remainder of the period the distance diminishes slightly. But while the common eastward motion of Sun and planet is about the same, *Venus* moves about 16° southward relative to the Sun, and this causes a considerable shortening of the interval between the rising of the two bodies. *Venus* has lost a considerable fraction of its autumn brilliance, but always retains its great brightness as compared with the other planets. Its occultation by the Moon on the early morning of Jan. 13 has already been mentioned.

Mars is an evening star, setting at about 10 P. M. local time during the two months, about a quarter of an hour earlier on Feb. 28 than on Jan. 1. It has lost the great brightness it had during the summer and early autumn of 1922, and begins the year with brilliance about equal to that of a first magnitude star, and will gradually fade to that of an ordinary second magnitude star like the pole star as it nears conjunction with the Sun in August. Its actual distance from the Earth in millions of miles will then be 248, nearly twice as great as it is on Jan. 1. It is in the constellation *Pisces* and moves 39° eastward and 17° northward during the two months. It passes the vernal equinox on Jan. 21, a little to the south of that point. It is also in close conjunction with the Moon on that date and for certain parts of the Earth will be occulted.

Jupiter rises just before 3 A. M. on Jan. 1 and shortly before midnight on Feb. 28, so it will not be in position for evening observation. It is in the constellation *Libra* and moves about 5° eastward and 1° southward from a point about 1° north and west of α *Librae*, the principal star of the constellation, although only about third magnitude.

Saturn is in the same general part of the heavens as *Jupiter* but rises earlier. Its distance from *Jupiter* is considerably greater than it was in 1922. On Jan. 1 it rises at about 1 A. M. and at the end of February at about 9 P. M. It is in the constellation *Virgo* and during January moves a little less than 1° eastward; on Jan. 30 it reverses its motion and retrogrades during February to the position it held on Jan. 1. The planet is about 5° north of *Spica*, α *Virginis*, the brightest star of the constellation, and is about one magnitude brighter than the star.

Uranus is an evening star setting about half after nine on Jan. 1 and at about six on Feb. 28. It is therefore rather too near the Sun for easy identification. It is in the constellation *Aquarius* and moves 3° eastward and 1° southward during the month. In early January it is less than a half degree east and south of the fourth magnitude star λ *Aquarii*.

Neptune is in the constellation *Cancer* and comes to opposition with the Sun on Feb. 6.